DRAFT
ENGINEERING EVALUATION
SAN FRANCISCO CONSERVATORY OF MUSIC
PLANT NO. 17862
APPLICATION NO. 14797

BACKGROUND

San Francisco Conservatory of Music is applying for an Authority to Construct and/or Permit to Operate for the following equipment:

S-1 Stationary Standby Generator Set: Diesel Engine; Make: Cummins; Model: 6CTAA8.3-G3; 317 HP

The standby generator will be located at 50 Oak Street, San Francisco, CA 94102.

EMISSIONS SUMMARY

Annual Emissions:

The CARB-certified emission factors for S-1 (317 HP- diesel engine U-R-002-0174) are listed below:

Component	Emission (g/kW-hr)	Emission (g/hp-hr)
NOx	5.225	3.899
CO	0.6	0.448
POC	0.275	0.205
PM_{10}	0.09	0.0672
SO_2	0.2459	0.1835

**The emission factor for SO2 is from Chapter 3, Table 3.4-1 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors.*

SO_2: 8.09E-3 (% S in fuel oil) lb/hp-hr = 8.09E-3 (0.05% S) (453.6 g/lb) = 0.1835 g/hp-hr

Pollutants		Factors		hp		Hours		lb/g		lbs/yr
NOx	=	(3.8989 g/hp-hr)*		(317 hp)*		(50 hrs/yr)*		(0.00220 lbs/g)	=	136.24 lbs/yr
CO	=	(0.4477 g/hp-hr)*		(317 hp)*		(50 hrs/yr)*		(0.00220 lbs/g)	=	15.64 lbs/yr
POC	=	(0.2052 g/hp-hr)*		(317 hp)*		(50 hrs/yr)*		(0.00220 lbs/g)	=	7.17 lbs/yr
PM_{10}	=	(0.0672 g/hp-hr)*		(317 hp)*		(50 hrs/yr)*		(0.00220 lbs/g)	=	2.35 lbs/yr
SO_2	=	(0.1835 g/hp-hr)*		(317 hp)*		(50 hrs/yr)*		(0.00220 lbs/g)	=	6.41 lbs/yr

Maximum Daily Emissions:

A full 24-hour day will be assumed since no daily limits are imposed on intermittent and unexpected operations.

For S-1:

Pollutants	Factors	hp	hr/day	lb/g	lbs/day
NOx	= (3.8989 g/hp-hr)*	(317 hp)*	(24 hr/day)*	(0.00220 lbs/g)	= 65.394 lbs/day
CO	= (0.4477 g/hp-hr)*	(317 hp)*	(24 hr/day)*	(0.00220 lbs/g)	= 7.509 lbs/day
POC	= (0.2052 g/hp-hr)*	(317 hp)*	(24 hr/day)*	(0.00220 lbs/g)	= 3.442 lbs/day
PM_{10}	= (0.0672 g/hp-hr)*	(317 hp)*	(24 hr/day)*	(0.00220 lbs/g)	= 1.126 lbs/day
SO_2	= (0.1835 g/hp-hr)*	(317 hp)*	(24 hr/day)*	(0.00220 lbs/g)	= 3.078 lbs/day

Plant Cumulative Increase: (tons/year)

Pollutant	Existing	New	Total
NOx	0	0.068	0.068
CO	0	0.0078	0.0078
POC	0	0.0036	0.0036
PM_{10}	0	0.0012	0.0012
SO_2	0	0.0032	0.0032
NPOC	0	0.000	0.000

Toxic Risk Screening:
The toxic emission of diesel particulate exceeds the District Risk Screening Trigger, as shown in Table 1 below, and a Risk Screening Analysis has been performed.

Table 1. Calculated incremental increase in diesel exhaust particulate matter for S-1

Source:	PM_{10} Emission Factor (g/HP-hr)	HP	Annual Usage (Hours/year)	Diesel Exhaust Particulate Emissions (lb/year):	Trigger Level (lb/yr)	Risk Screen Required? (Yes/No)
1	0.0672	317	50	2.347	0.58	Yes

Per the attached 7/5/2006 memo from Catherine Fortney, results from the health risk screening analysis indicate that the cancer risk for the maximally exposed non-residential receptor is 0.54 in a million and for the maximally exposed residential receptor is 0.53 in a million. The hazard index for the non-residential receptor is 0.0004 and for the residential receptor is 0.0003. The health risk screening results are based on the source operating 50 hours per year, excluding periods when operation is required due to emergency conditions. The maximum carcinogenic risk for the proposed new generator is calculated to be less than 10 in a million with a chronic hazard index of less than 1.0, these results are in accordance with Regulation 2, Rule 5.

The ISCST3 air dispersion computer model was used to estimate annual average ambient air concentrations. Stack and building parameters for the analysis were based on information provided by the applicant.

STATEMENT OF COMPLIANCE

The owner/operator of S-1 shall comply with Reg. 6 (Particulate Matter and Visible Emissions Standards) and Reg. 9-1-301 (Inorganic Gaseous Pollutants: Sulfur Dioxide for Limitations on Ground Level Concentrations). Since this engine meets TBACT for PM10 (<0.15 g/hp-hr), it is expected to comply with Reg. 6. Low sulfur diesel (0.05wt%) will be used to meet the sulfur limitation of 0.5wt% in Reg. 9-1-304. Because S-1 is an emergency standby generator, Reg. 9-8-110 (Inorganic Gaseous Pollutants: Nitrogen Oxides from Stationary Internal Combustion Engines) exempts the requirements for emission limits of Sections 9-8-301, 302, and 502. Allowable operating hours and the corresponding record keeping in Reg. 9-8-330 and 530 will be included in the Permit Conditions below.

S-1 will comply with the Airborne Toxics Control Measure for Stationary Compression Ignition Engines (ATCM). The allowable operating hours and recordkeeping requirements contained in the ATCM will be included in the Permit Conditions below.

The project is considered to be ministerial under the District's CEQA regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emissions factors and therefore is not discretionary as defined by CEQA. (Permit Handbook Chapter 2.3)

The project is located at the San Francisco Conservatory of Music. The Conservatory routinely has grade school age children, junior high age children, and high school age children taking classes in the afternoon. The San Francisco Conservatory of Music is not a K through 12 school.

The project is located within 1000 feet from the French-American International School and the Chinese-American International School both located at 150 Oak Street, San Francisco, CA 94102. The district school database indicated that a school may be located at 135 Van Ness, and this location was considered in the health risk screening assessment. It was determined that 135 Van Ness address is for San Francisco Unified School District offices and that no K-12 school is located at this address. A school was formerly located at 95 Gough Street (Spectrum Center) and this facility was considered in the health risk screening analysis. The project is subject to the public notification requirements of Reg. 2-1-412 due to the proximity of the proposed generator to the French-American School and the Chinese-American School .

Best Available Control Technology:

In accordance with Regulation 2, Rule 2, Section 301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NOx, CO, SO_2 or PM_{10}.

Based on the emission calculations above, the owner/operator of S-1 is subject to BACT for the following pollutants: NOx. BACT 1 levels do not apply for 'engines used exclusively for emergency use during involuntary loss of power' as per Reference b, Document 96.1.2 of the BAAQMD BACT Guidelines for IC Engines. Hence, the owner/operator has to the meet BACT 2 limits presented below.

POLLUTANT	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice 3. TBACT	TYPICAL TECHNOLOGY
NOx	1. *1.5 g/bhp-hr [107 ppmvd @ 15% O_2] a,b* 2. *6.9 g/bhp-hr [490 ppmvd @ 15% O_2] a,b,c* 3. *6.9 g/bhp-hr [490 ppmvd @ 15 % O2] d*	1. *Selective Catalytic Reduction (SCR) + Timing Retard + Turbocharger w/ Intercooler a,b* 2. *Timing Retard $\leq 4^o$ + Turbocharger w/ Intercooler a,b,c* 3. *Timing Retard $\leq 4^o$ + Turbocharger w/ Intercooler*

For NOx, the emission limits set by BACT 2 are met, as shown in Table 2 below.

Table 2. BACT Limits for S-1

Pollutant	Engine Emission Factors (g/hp-hr)	Emission Factor Limits as set by BACT 2 (g/hp-hr)	Have the limits been met?
NOx	3.899	6.90	YES

Therefore, S-1 is determined to be in compliance with the BACT 2 limits for NOx.

Since CARB certification data was used to establish the NOx emission factor, the BACT 2 emission limit has not been incorporated into the permit conditions and is assumed to be in compliance through the design standards demonstrated by the CARB certification testing.

Offsets: Offsets must be provided for any new or modified source at a facility that emits more than 10 tons/yr of POC or NOx. Based on the emission calculations above, offsets are not required for this application.

PSD, NSPS, and NESHAPS do not apply.

PERMIT CONDITIONS

Conditions for S-1 Emergency Diesel Generator
Application #14797, Plant #17862, San Francisco Conservatory of Music:

COND# 22850 ----------

1. Operating for reliability-related activities is limited to 50 hours per year per engine.

   [Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations,subsection (e)(2)(A)(3) or (e)(2)(B)(3)]

2. The owner or operator shall operate each emergency standby engine only for the following purposes: to mitigate emergency conditions, for emission testing to demonstrate compliance with a District, state or Federal emission limit, or for reliability-related activities (maintenance and other testing, but excluding emission testing). Operating hours while mitigating emergency conditions or while emission testing to show compliance with District, state or Federal emission limits is not limited.

   [Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(3) or (e)(2)(B)(3)]]

3. The owner/operator shall operate each emergency standby engine only when a non-resettable totalizing meter (with a minimum display capability of 9,999 hours) that measures the hours of operation for the engine is installed, operated and properly maintained.

   [Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(4)(G)(1)]

4. Records: The owner/operator shall maintain the following monthly records in a District-approved log for at least 36 months from the date of entry (60 months if the facility has been issued a Title V Major Facility Review Permit or a Synthetic Minor Operating Permit). Log entries shall be retained on-site, either at a central location or at the engine's location, and made immediately available to the District staff upon request.
   a. Hours of operation for reliability-related activities (maintenance and testing).
   b. Hours of operation for emission testing to show compliance with emission limits.
   c. Hours of operation (emergency).
   d. For each emergency, the nature of the emergency

condition.
e. Fuel usage for each engine(s).

[Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(4)(I), (or Regulation 2-6-501)]

5. At School and Near-School Operation:
If the emergency standby engine is located on school grounds or within 500 feet of any school grounds, the following requirements shall apply:
The owner or operator shall not operate each stationary emergency standby diesel-fueled engine for non-emergency use, including maintenance and testing, during the following periods:
a. Whenever there is a school sponsored activity (if the engine is located on school grounds).
b. Between 7:30 a.m. and 3:30 p.m. on days when school is in session "School" or "School Grounds" means any public or private school used for the purposes of the education of more than 12 children in kindergarten or any of grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in a private home(s). "School" or "School Grounds" includes any building or structure, playground, athletic field, or other areas of school property but does not include unimproved school property.

[Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(1)] or (e)(2)(B)(2)]

RECOMMENDATION
Issue an Authority to Construct to San Francisco Conservatory of Music for:

S-1 Stationary Standby Generator Set: Diesel Engine; Make: Cummins; Model: 6CTAA8.3-G3; 317 HP

EXEMPTIONS
None.

By:_____ Date:_____
Brian Lusher 7/6/06
Air Quality Engineer II